CLAIMS:

1. An apparatus for reducing acoustic noise in a magnetic resonance imaging (MRI) device, the apparatus comprising:

a gradient coil assembly of the MRI device coupled to a frame of the MRI device by suspension elements to reduce acoustic noise due to vibration transmission, each suspension element including at least one resilient element and an active drivable element for applying a compensating force to reduce vibration transmission,

wherein the active drivable element is positioned so as to not directly support the weight of the gradient coil assembly.

2. The apparatus of claim 1, wherein each suspension element includes:

a first support for applying forces to a support portion of the frame;

a second support aligned with the first support and immovable relative thereto;

a first resilient element for supporting a support portion of the gradient coil assembly on the support portion of the frame;

wherein the active drivable element is positioned between a second resilient element and the second support.

3. The apparatus of claim 2, wherein the first support and the second support are coupled to one another to form a C-fixture.

4. The apparatus of claim 2, further comprising an adjustable pre-stressing mount for adjusting the position of the first support relative to the support portion of the frame,

whereby the adjustable pre-stressing mount applies an adjustable pre-stress through the suspension element.

5. The apparatus of claim 1, wherein the support portions of the gradient coil assembly and the frame each include a mounting bracket.

6. The apparatus of claim 1, wherein the resilient element includes at least one of the group consisting of: at least one elastomeric pad and at least one spring.

7. The apparatus of claim 1, further comprising means for activating the active drivable element based on feedback from at least one of the gradient coil assembly and a cryostat shell.

8. The apparatus of claim 1, wherein the means for activating further activates the active drivable element based on a predetermined transfer function.

9. The apparatus of claim 1, wherein the active drivable element includes at least one of a piezoelectric actuator, a magnetic actuator and a hydraulic actuator.

10. A method for reducing acoustic noise due to vibration transmission from a gradient coil assembly to a frame of a magnetic resonance imaging device, the method comprising the steps of:

supporting a support portion of the gradient coil system relative to the frame using a resilient element; and

actively compensating for vibrations of the gradient coil assembly by applying a force, via an active drivable element, from a point not between the support portion and the frame.

11. An apparatus for reducing acoustic noise due to vibration transmission from a gradient coil assembly to a frame of a magnetic resonance imaging device, the apparatus comprising:

means for resiliently supporting a support portion of the gradient coil system relative to the frame; and

means for actively compensating for vibrations of the gradient coil assembly by applying a force from a point not between the support portion and the frame.

12. The apparatus of claim 11, further comprising means for activating the compensating means based on feedback from at least one of the gradient coil assembly and a cryostat shell.

13. The apparatus of claim 12, wherein the activating means further activates the active drivable element based on a predetermined transfer function.

14. A suspension element for reducing acoustic noise due to vibration transmission from a gradient coil assembly to a frame of a magnetic resonance imaging device, the apparatus comprising:

a C-fixture including a first support for applying forces to a support portion of the frame and a second support aligned with the first support and immovable relative thereto;

a first resilient element for supporting a support portion of the gradient coil assembly on the support portion of the frame; and

an active drivable element positioned between a second resilient element and the second support and configured to apply a force to reduce vibration transmission.

15. The suspension element of claim 14, wherein each resilient element includes at least

one of the group consisting of: at least one elastomeric pad and at least one spring.

16. The suspension element of claim 14, further comprising means for activating the active drivable element based on feedback from the gradient coil assembly.

17. The suspension element of claim 16, wherein the means for activating further activates the active drivable element based on a predetermined transfer function.

18. The suspension element of claim 14, wherein the active drivable element includes at least one of a piezoelectric actuator, a magnetic actuator and a hydraulic actuator.

19. The suspension element of claim 14, further comprising an adjustable pre-stressing mount for adjusting the position of the first support relative to the support portion of the frame,

whereby the adjustable pre-stressing mount applies an adjustable pre-stress through the suspension element.

20. The suspension element of claim 14, wherein the support portions of the gradient coil assembly and the frame each include a mounting bracket.